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ABSTRACT

Research emphasizing a psychological perspective of social comparison processes shows that school-average ability (SAA) is negatively associated with academic self-concepts (ASC). Sociological research indicates that SAA is negatively related to educational and occupational aspirations. The present study unites these two related research areas, and extends the diversity of outcomes and the theoretical frameworks considered. In a longitudinal analysis of High School and Beyond (HSB) data, the effect of SAA on a comprehensive set of academic outcomes (e.g., standardized test scores, ASC, course-work selection, academic effort, school grades, educational and occupational aspirations, and college attendance) was measured in the sophomore and senior years of high school and 2 years after high school graduation. The subjects included 10,613 respondents selected for the second follow-up of the sophomore cohort of the HSB study; all attended the same high school as sophomores and seniors. For the purposes of statistical testing, a sample size of 4,000 was used. The influence of SAA was not positive for any of the outcomes at any time and was moderately negative for some. The academic outcomes related to higher-ability schools were not commensurate with the ability levels of students attending these schools, and no academic advantages of such schools were observed for any outcomes. The negative effects of SAA were primarily mediated by ASC and educational aspirations. A list of 59 references, two tables, a description of the 23 constructs and variables from the HSB study, and two figures conclude the document. (Author/TJH)

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The Failure of Academically Selective High Schools To Deliver Academic Benefits: The Importance of Academic Self-Concept and Educational Aspirations

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The Failure of Academically Selective High Schools To Deliver Academic Benefits: The Importance of Academic Self-Concept and Educational Aspirations

Abstract

Emphasizing a psychological perspective of social comparison processes, Marsh (1987; Marsh & Parker, 1984) found school-average ability to be negatively associated with academic self-concepts. Emphasizing a sociological perspective of school context effects, Alwin and Otto (1977) reported school-average ability to be negatively associated with educational and occupational aspirations. The present investigation brings together these two related areas of research, extends the diversity of outcomes considered, and expands the theoretical frameworks considered. In a longitudinal analysis of the High School and Beyond data, the effect of school-average ability on a comprehensive set of academic outcomes (e.g., standardized test scores, self-concept, coursework selection, academic effort, school grades, educational and occupational aspirations, and college attendance) was measured in the sophomore and senior years of high school, and two years after high school graduation. The influence of school-average ability was not positive for any of the outcomes at any point in time and was moderately negative for some. The academic outcomes associated with higher-ability schools were not commensurate with the ability levels of students attending these schools and no academic advantages of such schools were observed for any outcomes. The negative effects of school-average ability were primarily mediated by academic self-concept and educational aspirations.

The Failure of Academically Selective High Schools To Deliver Academic Benefits: The Importance of Academic Self-Concept and Educational Aspirations

Students, due to explicit, implicit, or de facto selection processes, often find themselves in schools where the school-average ability level differs systematically from that of other schools. Educators and particularly parents often assume that there are academic benefits associated with attending academically selective schools. In apparent support of this conventional wisdom, academic outcomes such as academic achievement, aspirations and subsequent attainment are typically higher in academically selective high schools. This naive analysis, however, fails to take into account the initially higher abilities and other pre-existing differences of students who attend academically selective high schools. A better evaluation would be to compare academic outcomes after controlling for the pre-existing differences in students attending these schools.

Recent research calls into question the assumed benefits of academically selective high schools. Using a psychological perspective, Marsh (1987) found that school-average ability negatively affected academic self-concept such that equally able students had higher academic self-concepts in schools where the school-average ability was lower. He argued that: "For at least some children, the early formation of a self-image as a poor student may be more detrimental than the possible benefits of attending a higher-ability school" (P. 292). Theoretical models of the relations between self-cognitions, behavior, and subsequent attainment (e.g., Bandura, 1982, 1986) further posit that such changes in self-perceptions may affect academic choices, academic effort, and subsequent achievment. Using a sociological perspective, Alwin and Otto (1977) and others have examined the effects of school context on educational and occupational aspirations. They found school-average ability to be negatively associated with aspirations. The purposes of the present investigation are to bring together these two related areas of research, to extend the range of outcomes considered, and to expand the theoretical framework within which these effects are viewed.

Research to be described here has quite distinct historical antecedents. One antecedent is psychophysical research (see Helson, 1964; Woodworth, 1938). A lifted weight, for example, is judged as light or heavy in relation to other weights that form the immediate frame of reference. The same weight is judged as light in relation to heavier weights and heavy in relation to lighter weights. These psychophysical results generalize reasonably well to social-psychological stimuli where the appropriate frame of reference is not

so easily manipulated (e.g., Sherif & Sherif, 1969; Upshaw, 1969). A second antecedent is the sociological notion of relative deprivation (Stouffer, Suchman, DeVinney, Starr & Williams, 1949). Considering army units in which the rate of promotion differed substantially, Stouffer et al. found that one's own satisfaction varied in relation to the benefits experienced by others. Folger (1987) noted, however, that relative deprivation is typically a posthoc, atheoretical explanation of correlational results, thereby precluding cause-and-effect interpretations (also see Cook, Crosby & Hennigan, 1977).

In research directly relevant to the present investigation, Davis (1966) used relative deprivation to explain why the academic quality of colleges was relatively uncorrelated with students' career aspirations. He found that equally able students had higher career aspirations when attending colleges where the average-ability level was lower, leading him to conclude that: "The aphorism 'It is better to be a big frog in a small pond' is not perfect advice, but it is not trivial" (p. 31). Because colleges tend to grade on a curve, equally able students earned higher GPAs in lower-ability schools than in higher-ability schools. Although Davis did not have adequate data to fully test his predictions, his findings suggested that the negative effects of school-average ability on career aspirations were mediated in part by students' self-evaluations and their GPAs. In summarizing the implications of his study Davis noted that "feelings of success" are important in understanding the negative effects of school-average ability.

The Big Fish Little Pond Effect (BFLPE)

Theoretical Basis

Adapting the frog-pond metaphor, Marsh (1987, 1984a, 1984b; Marsh and Parker, 1984) described the big-fish-little-pond effect (BFLPE) whereby equally able students have lower academic self-concepts in higher-ability schools than in lower-ability schools. The basic tenets of this research are that: (a) equally able students who attend schools in which the school-average ability differs will use correspondingly different frames of reference in evaluating their own accomplishments and (b) this process will affect academic self-concept and subsequent academic outcomes.

There are many ways in which group membership influences the individual, but the focus of the present investigation is on the frame of reference or standard of comparison that groups provides (e.g., Festinger, 1954; Kelley, 1952; Goethals, 1986). Marsh (1987) noted, however, that the BFLPE is not the only plausible effect of school-average ability. For example, being an average ability student in a higher-ability school may affect academic self-

concept: (a) negatively because the basis of comparison is the performance of above-average students (the BFLPE or a contrast effect), (b) positively by virtue of membership in a the higher-ability grouping (a reflected glory, group identification or assimilation effect), or (c) not at all because academic self-concept is more strongly affected by other characteristics than the immediate context of other students or because (a) and (b) cancel each other. Support for the BFLPE implies that the contrast effects associated with school-average ability are larger than the assimilation effects, but it is likely that both effects act simultaneously.

The BFLPE is one specific example of more general frame of reference effects that have been studied widely in psychophysics and social psychology (e.g., Helson, 1964; Marsh, 1974; Sherif & Sherif, 1969; Upshaw, 1969). Consistent with this previous research, the standard of comparison is operationalized as the average ability level of other students in the school in the theoretical model used to explain the BFLPE (Figure 1). According to this model students: (a) compare their own academic ability (more or less accurately assessed) with abilities of other students within their school or their reference group and (b) use this relativistic impression of their academic ability as one basis of forming their academic self-concept. A possible operationalization of this model is presented in Figure 1 for students X, Y, and Z who vary in terms of academic ability. In relation to the entire population, student Y has an average level of academic ability. If student Y attends a higher-ability high school, however, his or her level of academic ability will be below the average of other students in the school and this will lead to an academic self-concept that is below average. If student Y attends a lower-ability high school, then the same level of objective academic ability will be above the average of other students in that school and will lead to an above average academic self-concept. In a similar manner, the academic self-concepts of students X and Z will be positively related to academic ability, but will be negatively related to the average ability level of the school that they attend.

Insert Figure 1 About Here

Empirical support for the BFLPE. Marsh (1987) reviewed a wide variety of studies by other researchers that were consistent with the BFLPE (e.g., Bachman & O'Malley, 1986; Kulik, 1985; Rogers, Smith & Coleman, 1978; Schwarzer, Jerusalem, & Lange, 1983; Strang, Smith & Rogers, 1978) and provided further support for his model. Understanding of the BFLPE was refined and expanded in an analysis of the Youth in Transition data (Marsh,

1987). Some earlier research (e.g., Soares & Soares, 1969; Trowbridge, 1970) emphasized school-average SES instead of school-average ability. Consistent with his model, Marsh posited that the BFLPE was determined by school-average ability and not school-average SES. As predicted, he found that whereas individual levels of ability and SES contributed positively to academic self-concept, the effect of school-average ability was negative and the effect of school-average SES was negligible. The BFLPE was reasonably specific to academic self-concept as the influence of school-average ability on academic self-concept was much larger than its influence on general self-concept.

Marsh (1987) also found that equally able students earned higher GPAs in lower-ability high schools than in higher-ability high schools. Frame-of-reference effects on GPA had indirect effects on subsequent academic self-concept and frame-of-reference effects on academic self-concept had indirect effects on subsequent GPA. Thus, the negative effects of school-average ability on GPA and on academic self-concept were mutually reinforcing. A longitudinal analysis suggested that academic self-concept had a direct effect on subsequent school grades and that part of this effect was due to the BFLPE. This longitudinal analysis also indicated that school-average ability had a different pattern of effects on GPA and academic self-concept. For GPA, school-average ability had a direct negative effect at time 1 (T1), but its negative effect on T2 GPA was mediated by T1 variables. For academic self-concept, school-average ability had a direct negative effect at T1 and both direct and indirect (mediated) effects at T2. Thus, school-average ability had a new negative effect on academic self-concept at T2 in addition to the already substantial negative effects at T1.

In an earlier analysis of the Youth and Transition data, Bachman and O'Malley (1986) found support for the BFLPE, but reported a smaller effect than did Marsh (1987). Bachman and O'Malley, however, excluded all Black students and all predominantly Black high schools from their study, thereby reducing the variability of school-average ability in their truncated sample. Consistent with his theoretical model, Marsh (1987) demonstrated that the size of the BFLPE should be directly related to the variability of school-average ability so that: (a) when the variance was truncated as in the Bachman and O'Malley study, the BFLPE was smaller than for the total sample (including Blacks) considered by Marsh and (b) when variance is increased by selecting just higher-ability and lower-ability schools the BFLPE would be larger than for the total sample. The size of the BFLPE is thus dependent on the decision context. Consider, for example, upper-middle

class parents living in the inner-city who are deciding whether to send their child to a lower-ability school or an academically selective school. For them the second, larger estimate of the BFLPE would be most relevant.

In summary, these results indicate that school-average ability is negatively associated with academic self-concept and with school grades. Important questions not addressed by Marsh (1987) were whether these negative effects of school-average ability have implications for other academic outcomes and whether there are academic benefits associated with attending academically selective schools that offset these disadvantages.

Effective Schools and School Contexts

Sociologists (e.g., Alexander & Eckland, 1975; Alwin & Otto, 1977; Bachman and O'Malley, 1986; Davis, 1966; Jencks and Brown, 1975; Meyer, 1970) have considered a phenomenon like the BFLPE from a different perspective. This research stems largely from attempts to identify effective schools and context variables that might explain this effectiveness. In these studies, school context variables were related primarily to educational and occupational aspirations (or attainment). A wide variety of contextual variables have been studied, but school-average ability and particularly school-average SES have been considered most frequently. The size of these contextual effects, after controlling for individual level variables, is consistently small for educational and occupational aspirations (or attainments), leading some (e.g., Bachman & O'Malley, 1986; Hauser, Sewell & Alwin, 1976) to dismiss these effects as apparently unimportant. These interpretations, however, must be tempered with the widely established finding that school-effects of any kind are typically very small (e.g., Jencks, 1985; Jencks & Brown, 1975). In contrast, others (Alexander & Eckland, 1975; Alwin & Otto, 1977; Meyer, 1970) have noted what appears to be a consistent tendency for school-average ability to be negatively associated with subsequent outcomes and for school-average SES to be positively associated with subsequent outcomes, though still conceding the size of such effects to be small.

Alwin and Otto (1977) reviewed previous research showing that school-average ability was negatively associated with aspirations whereas school-average SES was positively associated with aspirations. They argued, however, that these contextual studies typically had not considered a sufficiently broad range of outcome variables. More specifically, they reasoned that school contextual effects must operate through intervening variables so that contextual effects can be better understood if these mediating influences are identified. Many theoretical accounts of school context effects, according to

Alwin and Otto, implicitly assume that context effects are mediated through social psychological variables without testing this assumption. Echoing earlier pleas (e.g., Campbell & Alexander, 1965; Hauser, 1970), Alwin and Otto called for the specification of the interpersonal processes that mediate school contextual effects and for empirical tests of these theoretical descriptions of context effects.

Alwin and Otto (1977), in response to problems identified in their review, analyzed data from a large representative sample of high school seniors. Their empirical results provided support for only some of their predictions. As predicted, school-average ability had negative effects on a variety of outcome variables including school grades, selection of academically oriented courses, educational aspirations, and occupational aspirations. School-average SES had positive effects on academic course selection and occupational aspirations but had no significant effect on educational aspirations or school grades. In contrast to their expectations, Alwin and Otto found little support for the contention that the negative effects of school-average ability were mediated by the variables that they considered. Based on these findings, Alwin and Otto argued that an important unresolved issue was to identify the intervening processes that mediate the contextual effects. The implicit assumption that contextual effects operate through social-psychological variables may be unwarranted unless mediating variables representing these processes can be identified.

Alwin and Otto (1977), like most school context studies, considered data from only one point in time. Recognizing potential problems associated with this design, Alwin and Otto also called for further research using longitudinal rather than single-wave data. They noted that whereas longitudinal studies (e.g., Hauser et al., 1976) had been conducted, they had typically not looked at the association between school-context variables and changes in academic outcomes. Longitudinal research is particularly important in the quest to find social-psychological processes that mediate the effects of school context on aspirations and subsequent attainment.

Bringing Together Different Theoretical Perspectives

The theoretical model used to explain the BFLPE (Figure 1) posits a specific psychological process, but does not relate this process to other academic outcomes except by implication. As noted by Alwin and Otto (1977), sociological models of school context effects typically imply that social-psychological processes mediate the effects of school-average ability without actually testing this assumption. There appear to be benefits in joining the

two approaches. Academic self-concept, the major outcome in BFLPE research, may be the critical process variable that mediates the effects of school-average ability on educational aspirations and other distal outcomes emphasized in school contexts research. Theoretical models are needed that link the proximal outcomes of school-average ability emphasized in the BFLPE studies with the distal outcomes emphasized in school context research. Theoretical perspectives developed in self-efficacy research and in motivational research may provide the necessary links

Self-efficacy. Increasingly, researchers have sought theoretical models of the relations between self-cognitions, behavior, and subsequent attainment. Bandura's theory of social cognition (Bandura, 1982, 1986) is perhaps the best known of these models and has been widely applied in educational settings by Schunk (1985, 1984) and others. In Bandura's theory perceived self-efficacy is based on an individual's belief that he or she has the necessary capabilities to succeed in a particular situation. Self-efficacy is not just a reflection of ability in that equally able students will differ in perceived self-efficacy and these differences influence subsequent outcome variables (Schunk, 1985; 1984). High perceived self-efficacy is posited to promote appropriate task choice, motivation, sustained effort and persistence, and eventual success in academic settings, and this academic success will reinforce subsequent perceptions of academic self-efficacy. Previous performance is the strongest determinant of perceived self-efficacy which tends to improve after success and decline after failure but vicarious experience is also emphasized in self-efficacy research.

Vicarious experience influences self-efficacy by providing models of effective strategies and a social comparison for evaluating task difficulty or performance levels. Particularly in the classroom, students acquire information through observations of how others perform. In his application of Bandura's theory to educational settings Schunk (1985) emphasized that students use social comparison processes to evaluate the demands of a task and to evaluate their own likelihood of success. For such purposes, observing the performances of other students whose abilities are similar to those of the subject offers the most useful feedback (Schunk, 1985; 1984). In this use of social comparison, little emphasis is placed on the standards that students use to evaluate what constitutes success. These may be implicit in the task or supplied by the researchers (e.g., a criterion-referenced task). In the present investigation social comparison is posited to serve a somewhat different role. Here, students are posited to use the performances of others

to evaluate the relative success of their own performance (e.g., a norm-referenced task). For such purposes, the average performance level of all other students is a useful basis of comparison although other salient anchors (e.g., the "smartest kids in the school," the "dumbest kids in the school," or "kids like me") may also exist. These two roles of social comparison processes are not mutually exclusive and their relative importance will vary depending on nature of the task.

Constructs used in self-efficacy research are considered here, but the focus is on academic self-concept rather than self-efficacy. Bandura (1986) argued that it is important to distinguish between content specific measures of self-efficacy and global, undifferentiated measures of general self-concept. Marsh (1987; Marsh, Shavelson & Byrne, 1988), however, argued for a similar distinction between content specific components of academic self-concept and general self-concept. Norwich (1987) examined the ability of both math self-concept and task-specific self-efficacy to predict subsequent mathematics performance. He found that both self-efficacy and self-concept were positively correlated with academic performance, but that self-concept was more high correlated whereas self-efficacy did not contribute to the prediction of performance beyond the contribution of self-concept.

Motivational theories. Alwin and Otto (1977) and other school context studies typically consider only a single wave of data and so educational aspirations are used as a surrogate for subsequent educational attainment. Recent motivational theories (e.g., Maehr, 1984; Maehr & Braskamp, 1986; Triandis, 1977), however, emphasize the separation of behavioral intents and subsequent behavior. In these motivational theories, the effects of prior behavioral determinants on subsequent behavior are mediated through behavioral intents. Self-related constructs are posited to be an important determinant of behavior intents so that much of their influence on subsequent behavior is mediated through behavioral intents. Translating these theoretical perspectives into the present situation, school context may influence academic self-concept (directly) and educational aspirations (indirectly and/or directly) formed during early high school years. These initial effects then mediate the influence of school context on subsequent academic outcomes during later high school years and eventually on educational attainment. Ideally, tests of this formulation require longitudinal data in which the relevant constructs are assessed near the start of high school, near the end of high school, and at least once after high school graduation.

Methods

The Present Investigation

The first major purpose of the present investigation is to examine the influence of school-average ability on academic outcomes like those considered in BFLPE and school context studies. This study considers a greater diversity of academic outcomes than previous research and, more importantly, examines the effects of school-average ability over time. The second major purpose of this study is to examine the role of academic self-concept and educational aspirations as mediators of the effects of school-average ability on subsequent academic outcomes.

Path analysis was used to relate the variables in Appendix 1 that are part of the High School and Beyond (HSB) study. The major components of the path model are: (a) individual-level and school-average measures of academic ability[1] (a battery of standardized tests) and SES (income, education, and material possessions); (b) self-concept (academic and general), academic choice behavior (coursework selection), academic effort (time spent on homework and class preparation), school grades (GPA), educational aspirations, and occupational aspirations measured in the sophomore year and again in the senior year of high school, and (c) college attendance, educational aspirations and occupational aspirations two years following the normal graduation from high school. The ordering of variables in the proposed path model is based on the temporal ordering of the variables, Bandura's theory of social cognition (1986), BFLPE research (Marsh, 1987), and school-context research (Alwin & Otto, 1977), and motivational theories (Maehr, 1984; Triandis, 1977). Based on a temporal ordering T1 (sophomore year) variables were posited to affect T2 (senior year) variables which were posited to affect T3 (post-secondary) variables. Based on Bandura's model, academic ability was assumed to affect self-concept which affected course selection, academic effort, and GPA. Consistent with school-context research, educational and occupational aspirations were assumed to follow these variables. Based on Maehr's motivational theory, educational aspirations are posited to play an important mediating role in predicting subsequent college attendance. (A more detailed discussion of the path model in Figure 2 is presented as part of the presentation of the results.)

Consistent with previous BFLPE research it is hypothesized that the effect of school-average ability will be: (a) negative for both academic self-concept (i.e., the BFLPE) and GPA, (b) more negative for academic self-concept than for general self-concept, and (c) more negative than the effect of school-average SES. Consistent with school context research it is

hypothesized that school-average ability will negatively affect educational and occupational aspirations and subsequent university attendance whereas the effects of school-average SES may be positive. Finally, though not previously tested, it is hypothesized that much of the negative effects of school-average ability will be mediated by academic self-concept and, subsequently, educational aspirations.

Sample and Data

Subjects are the 14,825 respondents selected for the second follow-up of the sophmore cohort of the HSB study. The sophomore cohort initially involved a two-stage probability sample of 1,015 high schools and approximately 36 sophmores within each of these high schools. The second-followup consisted of a probability sample of 14,825 of the original sample. Included on the commercially available data file for the second follow-up study are variables collected in 1980 when respondents were high school sophmores (T1), in 1982 when most respondents were high school seniors (T2), and in 1984 two years after the normal time of high school graduation (T3). A detailed description of this data base is available in the user's manual produced by the National Center for Educational Statistics (NCES, 1986). Because the focus of the present investigation is on the longitudinal frame-of-reference effects associated with a particular high school, only students who attended the same high school at T1 and T2 were considered (students who had the same school identification number in 1980 and 1982, had not dropped out, had not transferred to another school and had not already graduated), thereby reducing the sample size to a total of 10,613 students. Unreported supplemental analyses demonstrated that the exclusion of students who did not attend the same high school had little or no effect on conclusions for just T1 (also see Marsh, 1987, for similar results based on the Youth in Transition data).

Responses in the present analysis were weighted so as to take into account the disproportionate sampling of specified subgroups in the HSB design (NCES, 1986, Table 3.5-1). Because of the cluster sampling in the HSB study, standard errors based on the assumption of simple random sampling substantially underestimate the sampling variability in summary statistics and distort tests of statistical significance. In order to compensate for this bias, the weight for each student was divided by the estimated design effect of 2.40 (NCES, 1986, Table 3.6-5), reducing the nominal sample size from 10,613 to 10,613/2.40 = 4422. (This reduction in nominal sample size has no effect at all on parameter estimates; it only affects the df used in tests of statistical significance). A correlation matrix was then constructed for

the 23 variables (See Appendix 1 for a detailed description of these variables) using pairwise deletion for missing values. The weighted number of cases for each variable varied from 3441 to 4422. For purposes of statistical testing, a sample size of 4000 was assumed.

In relation to the hypothesized model (see Figure 2), correlations between constructs can be divided into total effects and noncausal effects, and total effects can be further divided into direct (unmediated) and indirect (mediated) effects. For purposes of the present investigation, relations are summarized in terms of total association (correlations), direct effects (path coefficients), and total effects (direct and indirect effects). The effects were estimated as standardized regression coefficients using the multiple regression procedure in SPSSx (SPSS, 1986).

Results

The Total and Mediated Effects of School-average Ability

Total effects of school-average ability. A major focus of the investigation is on the total effects (i.e., the total of direct and mediated effects) of school-average ability on academic self-concept, GPA, educational aspirations, and other academic outcomes. In relation to the theoretical path model (Figure 2) the total effects of the school-average variables are the relations between school-average variables and subsequent outcomes after controlling the effects of sex, individual ability, and family SES. These estimates were the standardized beta weights obtained from a series of multiple regressions in which the five independent variables (sex, individual ability, family SES, school-average SES and school-average ability) were used to predict T1, T2, and T3 outcomes. It is important to note that these total effects depend in no way on the particular ordering of T1, T2 and T3 outcomes in Figure 2.

Insert Table 1 About Here

School-average ability is negatively associated with almost all of the T1, T2 and T3 outcomes: 15 of the 17 relations are significantly negative and 2 are not statistically significant (Table 1). As expected, school-average ability most negatively affects (betas between -.20 and -.23) academic self-concept as in the BFLPE studies and educational aspirations as in the school-context studies. School-average ability has somewhat smaller negative associations (betas between -.08 and -.18) with coursework selection, GPA, occupational aspirations and to a lesser extent general self-concept and college attendance. School-average ability is also negatively related to subsequent standardized test scores (T2) but this statistically significant

effect (beta = -.03) is very small. Associations between school-average ability and effort are not statistically significant. An important feature of this analysis is that the same outcomes measured at T1 were also measured at T2 and some were measured at T3 as well. The pattern of statistical significance, the direction of the effects, and even the size of the effects are consistent at each point in time (Table 1). This consistency constitutes an important replication of the general findings and provides a strong control against any idiosyncratic influences that may have operated at any one of the three points in time.

The effects of school-average SES are not the major focus of the present investigation, but they have been emphasized in school context studies. In contrast to the total effects of school-average ability, relations involving school-average SES are smaller and tend to be positive instead of negative (Table 1): 11 of 17 effects were statistically significant and all of these are positive. This contrasting set of relatively larger negative effects associated with school-average ability and relatively smaller positive effects associated with school-average SES is consistent with previous research reviewed by Alwin and Otto (1977).

A much more demanding approach to evaluating the effects of school-average variables is to relate them to T2 and T3 outcomes after controlling either the matching T1 outcome or the entire set of T1 outcomes. The standardized beta weights from these multiple regressions (Table 1) test whether systematic changes in outcome variables during the last two years of high school are associated with the school-average variables. These tests are conservative in that any effects of school-average ability already experienced by the middle of the sophomore year in high school (T1) are controlled when evaluating the effects on T2 and T3 outcomes. In the language of path analysis, the indirect effects of school-average ability that are mediated through T1 outcomes are not considered. These tests may also be more defensible in that they provide stronger controls for pre-existing differences that may be confounded with the effects of school-average variables.

Controlling each T2 and T3 outcome for the matching T1 outcome (excluding college attendance which had no matching T1 outcome) reduces the negative effects of school-average ability (Table 1). These reductions, however, are typically modest. Furthermore, every T2 and T3 variable that was negatively affected by school-average ability before controlling the matching T1 outcome was still negatively affected by school-average ability after controlling the matching T1 variable. Thus, this added control had no effect

on the pattern of statistically significant effects.

Controlling the entire set of T1 outcomes (including college attendance) substantially reduces the negative effects of school-average ability (Table 1) on T2 and T3 outcomes. Nevertheless, 7 of the 11 effects are still significantly negative and none are significantly positive. Whereas much of the effect of school-average ability is mediated through the T1 outcomes, there are additional effects that are not. This suggests, at least for some outcomes, that there are new negative effects of school-average ability at T2 and T3 beyond the already substantial negative effects experienced at T1.

This analysis of school-average ability effects at T2 and T3 after controlling T1 outcomes also corresponds to the type of design typically used to test school effects in other HSB research. For example, this type of design has been used extensively in studies of the effects of attending public or Catholic high schools (see Alexander & Pallas, 1985; Hoffer, Greeley & Coleman, 1985; Jencks, 1985; Marsh, 1988; Willms, 1985) and of attending single-sex or coeducational high schools (Marsh, in press) . In that research, as in all studies of school effects, an important problem is disentangling true school effects from the pre-existing differences in students who attend different types of schools. Typically, advantaged students are more likely to attend what appears to be more effective schools, and so the minimally acceptable design must relate changes over time to different school types as in the single-sex/coeducational and public/Catholic high School studies. The situation, however, is different in the present investigation because initially more advantaged students attend what are interpreted to be less effective schools. Thus, any uncontrolled pre-existing differences are likely to work against the negative effects of school-average ability. For this reason it seems defensible to interpret as school-type effects the negative associations between school-average ability and subsequent outcome measures even when more stringent controls are not introduced. Nevertheless, the finding that school-average ability negatively affects T2 and T3 outcomes even after controlling for T1 outcomes provides compelling support for the validity of at least the direction of the effects.

Mediated effects. The second purpose of the present investigation is to examine process variables -- particularly academic self-concept and educational aspirations -- that might mediate the subsequent negative effects of school-average ability. For example, to the extent that controlling T1 academic self-concept reduces the negative effects of school-average ability on subsequent T1, T2, and T3 outcomes, then there is support for the

hypothesis that academic self-concept mediates these effects of school-average ability. Even if controlling T1 academic self-concept substantially reduces the negative effects of school-average ability on other T1 outcomes, the interpretation of these results depends in part on the posited ordering of the T1 variables in Figure 2 (i.e., that academic self-concept precedes the other T1 outcomes). For T2 and T3 outcomes these interpretations are more straight-forward since it is reasonable to assume that the T1 academic self-concept precedes T2 and T3 outcomes without reference to a theoretical model. For this reason I will focus on how controlling T1 outcomes alters the effects of school-average ability on T2 and T3 outcomes. Also, in results already discussed, it was shown that even when all the T1 outcomes were controlled, school-average ability still had statistically significant negative effects on T2 and T3 outcomes. Thus, it is clear that neither academic self-concept nor any other T1 outcome mediates all of the negative effects of school-average ability.

In the first set of analyses, a series of multiple regressions was conducted in which academic self-concept (T1) was added to the five independent variables (see Table 1). Controlling academic self-concept results in less negative (or more positive in the case of effort -- see path model results for further discussion) effects of school-average ability for every one of the remaining T1, T2, and T3 outcomes. This provides strong support for the hypothesis that academic self-concept mediates some of the negative effects of school-average ability. Nevertheless, the negative effects of school-average ability are still statistically significant for 13 of the remaining 16 outcomes. These negative effects are largest (betas < -.1) for educational aspirations (T1, T2 and T3), coursework selection (T1 and T2), and, surprisingly, T2 academic self-concept. Furthermore, controlling for all the T1 outcomes (Table 1) consistently reduces the size of the school-average ability effects more than does controlling for just T1 academic self-concept. Thus, it is clear that many of the negative effects of school-average ability are not mediated by T1 academic self-concept. In fact, much of the negative effect of school-average ability on even T2 academic self-concept is not mediated by T1 academic self-concept.

A second, more exploratory, set of analyses was conducted in which each of the other T1 outcomes was controlled singly and in combination with academic self-concept. Although these analyses are not presented, controlling other T1 outcomes was generally unable to reduce the negative effects of school-average ability as much as controlling academic self-concept.

Furthermore, controlling academic self-concept in combination with other T1 outcomes did not have much more effect than controlling just academic self-concept. T1 educational aspirations were, however, the notable exception to this generalization (see Table 1). Controlling T1 educational aspirations reduced the negative effects of school-average ability in each of the subsequent T2 and T3 outcomes. Across all the T1 and T2 outcomes, controlling both academic self-concept and educational aspirations reduced the negative effects of school-average ability more than controlling just one or the other. Furthermore, negative effects of school-average ability after controlling both academic self-concept and educational aspirations did not differ substantially from those based on controlling all 7 T1 outcomes.

The results presented in this section suggest that many of the negative effects of school-average ability are mediated by academic self-concept and educational aspirations. The importance of academic self-concept as a mediating variable support the a prior predictions that prompted this study. The importance of educational aspirations as a mediating variable is consistent with the findings from school context research and particularly the motivation models in which the effects of behavioral determinants on actual behavior are mediated by behavioral intents.

Not all of the negative effects of school-average ability are mediated by T1 academic self-concept and T1 educational aspirations. In fact, even after controlling for both these T1 outcomes, the largest negative effect of school-average ability is for T2 academic self-concept. This implies that school-average ability continues to negatively affect academic self-concept during the last two years of high school beyond its already substantial negative effect on academic self-concept in the sophomore year. Marsh (1987) reported a similar pattern of results in his longitudinal analysis of the Youth In Transition data. This implies that in order to fully evaluate the role of academic self-concept as a mediator of the negative effects of school-average ability on T2 and T3 outcomes, the effects of T2 academic self-concept need to be controlled in addition to the effects of T1 academic self-concept and T1 educational aspirations. In these analyses, the negative effects of school-average ability are further reduced (Table 1). Whereas the negative effects of school-average ability are still statistically significant for some outcomes (T2 GPA, T2 coursework selection, and T3 educational aspirations) these effects are small (betas < .09). The interpretation of the effects of controlling T2 outcomes for T2 academic self-concept can only be made in relation to a theoretical model of the

ordering of these T2 outcomes. The pattern of results are, however, consistent with the academic self-concept's role as a mediator of the negative effects of school-average ability. The finding that school-average ability effects are mediated by T2 academic self-concept is not surprising. What may be surprising, however, is that school-average ability has such negative effects on T2 academic self-concept beyond its already substantial negative effects on T1 academic self-concept and other T1 outcomes.

Summary of the effects of school-average variables. The results described here are generally consistent with previous research. Consistent with BFLPE studies (e.g., Marsh, 1987) school-average ability is negatively related to academic self-concept. Consistent with school context studies (e.g., Alwin & Otto, 1977) school-average ability is negatively associated with educational aspirations and other academic outcomes whereas school-average SES tends to be positively associated with some of these same outcomes. Consistent with a priori predictions, many of the negative effects of school-average ability are mediated by T1 academic self-concept. Furthermore, most of the negative effects of school-average ability are mediated by the combination of academic self-concept (T1 and T2) and educational aspirations (T1). The results of the present investigation are more compelling than those in previous research because: (a) the size and quality of the HSB sample and the diversity of academic outcomes are superior to most previous research; (b) the negative effects of school-average ability at T2 and T3 persist even after controlling for T1 outcomes so that many alternative explanations of the effects are implausible; and (c) the mediating variables that school context researchers have been unable to find were apparently identified in the present investigation. These effects will now be examined in relation to the path model summarized in Figure 2.

The Path Model Used To Evaluate School-average Ability.

The path model in Figure 2 posits a specific ordering of the 23 constructs based on the temporal ordering of the variables and previous research. In order to simplify the diagram, the 23 constructs are presented as four blocks representing the independent variables and the T1, T2 and T3 outcomes. Every variable within the same block is posited to affect every variable in all subsequent blocks as reflected by the single-headed arrows connecting the blocks. Within each block are ovals that contain one or more variables. The single-headed arrows connecting the ovals within each block represent the ordering of variables within that block. Some ovals contain more than one variable and no ordering of variables within the same oval is

posited (e.g., academic and general self-concepts) but variables within the same oval are assumed to be correlated. Effects associated with different variables in relation to this path model are summarized below.

Insert Table 2 About Here

Effects of school average ability. In evaluating the influence of school-average ability it is important to consider the total effects as well as the direct effects. Because school-average ability negatively affects academic self-concept, GPA, educational aspirations and other T1 outcomes, and these variables in turn affect subsequent outcomes, the indirect effects of school-average ability are typically negative. For this reason, the total effects of school-average ability are more negative than the direct effects. Thus, for example, whereas school-average ability has little direct effect on T2 GPA, its total effect is negative and about the same size as the negative effect on T1 GPA.

The focus of previous BFLPE studies was on the effects of school-average ability on academic self-concept and GPA. In the present investigation school-average ability had a negative direct effect on academic self-concept and GPA at T1, and an additional negative direct effect on academic self-concept at T2. The direct negative effect of school-average ability on academic self-concept at T2 is important because it is a new effect in addition to those effects mediated through intervening variables from T1. Changes in academic self-concept that occur between T1 and T2 are negatively related to school-average ability. In contrast school-average ability had only a very small negative effect on GPA at T2 other than the effects mediated through GPA at T1 and other intervening variables. The direction, pattern of significance, and even the size of these effects are similar to those found for the Youth in Transition data (Marsh, 1987), thus providing an important replication of that earlier research.

The direct and indirect effects of school-average ability on general self-concept at T1 are also negative, but much smaller than the corresponding effects on academic self-concept. In fact, except for the relations between academic and general self-concepts at T1 and T2, general self-concept has little effect on and is little affected by any other variables considered in this study. Whereas no ordering of the academic and general self-concept variables is posited, analyses summarized in Table 1 indicate that school-average ability has no effect on general self-concept beyond what can be explained in terms of academic self-concept. These results are consistent with analysis of the Youth in Transition data, leading Marsh (1987; also see

Marsh, Byrne, & Shavelson, 1988) to question the usefulness of General self-concept as an academic outcome. Because academic self-concept is just one component of general self-concept, these results suggest that nonacademic components of self-concept (e.g., physical and social) may not be affected by school-average ability.

School-average ability negatively affects coursework selection directly and indirectly at both T1 and T2. Equally able students are less likely to take advanced coursework in English and mathematics and to be in the academic track when they attend higher-ability schools than when they attend lower-ability schools. This effect is stronger at T2 than T1 and there is a direct effect of school-average ability on coursework selection at T2 beyond what can be explained by intervening variables. This means that changes in coursework selection are negatively related to school-average ability. Thus, students in higher-ability high schools are more likely to shift from more demanding courses to less demanding courses during their last two years of high school than are students in lower-ability high schools. Also, T1 coursework contributes substantially to educational aspirations -- even after controlling for the effects of T1 academic self-concept. This implies that some of the negative effects that school-average ability has on educational aspirations are mediated through coursework selection.

Academic effort, the next variable in path model, is inferred from the amount of time spent on homework and coming to class prepared. In contrast to other constructs, school-average ability has little systematic effect on effort. Whereas its direct effect is significantly positive (beta = .09) at T1, the total effects of school-average ability are not statistically significant. At T1, academic self-concept suppresses the effect of school-average ability on effort. That is, school-average ability negatively affects academic self-concept which leads to a reduction in effort but the direct effect of school-average ability on effort is positive. These indirect and direct effects of school-average ability cancel each other so that academic effort does not vary as a function of school-average ability. A similar pattern occurs for T2 effort when T2 academic ability is controlled (see Table 1) though these effects are eliminated when T1 effort is also controlled.

Educational and occupational aspirations were measured at T1, T2 and T3. For occupational aspirations, the direct and total effects of school-average ability are significantly negative at T1. Because the total effects at T1 are substantially larger than the direct effects, much of the negative effect of

school-average ability is mediated through other T1 variables. Much of this mediated effect can be explained in terms of academic self-concept (Table 1). At T2 and T3, the total effects of school-average ability on occupational aspirations are also negative and nearly the same size as those at T1, but the direct effects are not statistically significant at T2 or T3. The negative effects of school-average ability on T2 and T3 occupational aspirations are totally mediated by intervening variables. Inspection of Table 1 indicated that controlling academic self-concept (T1 and T2) and educational aspirations (T1) eliminates statistically significant effects of school-average ability on occupational aspirations.

For educational aspirations, the total effects of school-average ability are about the same size as those for academic self-concept and more negative than those for any other variables. Whereas the direct effect of school-average ability on T2 educational aspirations is not statistically significant, its direct effect on T3 educational aspirations is. This suggests that school-average ability may continue to have negative effects even after a student has graduated from high school, though the size of this direct effect is small.

The remaining variables in the path model are ability at T2 and college attendance. Whereas the direct effects of school-average ability are not statistically significant for either of these variables, the total effects are significantly negative -- though small -- for both.

The effects of T1 and T2 outcomes. A theoretically and logically plausible chain of effects (Figure 2) was used to relate an important set of academic constructs. This chain is also important in understanding the negative effects of school-average ability in that much of this effect is mediated through intervening variables. At T1, academic self-concept is substantially affected by academic ability and school-average ability, and it in turn affects course selection, academic effort, GPA, and subsequent aspirations. Whereas GPA is most strongly influenced by ability and academic self-concept, it is also directly or indirectly affected by school-average ability, course work and effort.

Educational aspirations at T1 are directly or indirectly affected by all the variables that precede it except for general self-concept. The effects of both SES and school-average SES on educational aspirations are positive and not much of this effect is mediated by intervening variables. In contrast, the substantial and positive effect of ability on educational aspirations is largely mediated by intervening variables -- mostly academic self-concept

and, to a lesser extent, coursework selection -- though there remains a substantial direct effect that cannot be explained by intervening variables. Academic self-concept has by far the largest total effect (TE=.35) and direct effects (DE=.26) on educational aspirations, though some of its total effect is mediated through intervening variables. Educational aspirations are also substantially affected by coursework selection (DE=.17) and, to smaller extents, by effort (DE=.09) and GPA (DE=.09).

Occupational aspirations at T1 are less affected by other variables that precede it than were T1 Educational aspirations, though the general pattern of effects is similar. The major exception to this generalization is the substantial effect of sex -- favoring girls -- on occupational aspirations. Furthermore, the direct effect of sex is substantial (beta > .1) for occupational aspirations at T2 and T3. Because sex differences are not a focus of this study these effects were not explored but they apparently warrant further investigation.

Each T2 outcome was most strongly affected by the corresponding T1 outcome. The direct effects of other T1 variables on each T2 variable are typically much smaller, and total effects are mediated through intervening constructs. T2 academic self-concept, is, perhaps, an exception to this pattern. Whereas T1 academic self-concept has the largest effect on T2 academic self-concept, every other T1 variable also had a statistically significant and positive direct effect on T2 academic self-concept. T2 coursework was also directly affected by T1 GPA and educational aspirations in addition to T1 coursework.

Because of the substantial effects of T1 variables on T2 variables, the sizes of effects among the T2 variables are smaller than observed at T1. Nevertheless, many of the patterns observed at T1 are also evident at T2. In particular, academic self-concept at T2 is significantly affected by ability and significantly affects all subsequent T2 variables. Similarly, educational and occupational aspirations are directly influenced by all preceding T2 variables except for general self-concept.

It is important to emphasize that the pattern of results described here was evaluated in relation to the path model in Figure 2. Whereas it is clear that T1 variables temporally precede T2 variables, the ordering of variables collected at each occasion is less definitive. This problem is exacerbated by the fact many of the constructs reflect a cumulative effect over a period of time. GPA, for example, refers to all high school grades earned prior to T1 or to T2. Hence, a strict temporal ordering of the variables may be

impossible to determine so that any ordering of variables must be justified on the basis of theory such as Bandura's social cognition theory. Though not the focus of the present investigation, it may be possible to disentangle the complicated set of reciprocal effects that are likely to exist within this set of variables, but conclusions based on such analyses must still be evaluated cautiously (e,g., Rogosa, 1979).

Determinants of post-secondary (T3) outcomes. In evaluating the effects of preceding variables on T3 outcomes, it is important to consider both direct and total effects. Not surprisingly, the effects of the independent variables and T1 outcomes are largely indirect and mediated through T2 variables.

College attendance is a complexly determined construct. Whereas the independent variables and T1 outcomes have substantial total effects on college attendance, these effects are largely mediated by T2 variables. The largest total effects are for ability, SES, and educational aspirations, though the total effects of academic self-concept, coursework, effort, and GPA all have betas greater than .1. The positive effects of school-average SES and the negative effects of school-average ability are smaller, but still statistically significant. Girls are more likely to attend college than boys (beta= .10) though these effects are largely mediated by intervening variables (girls have slightly higher academic self-concepts, expend more effort, and earn somewhat higher grades). In contrast to these total effects, only the direct effects of SES and educational aspirations on college attendance are statistically significant.

College attendance is substantially affected by many of the T2 variables, but these effects are largely mediated by T2 educational aspirations. The total effects of most of the T2 variables are statistically significant, but the largest effects are educational aspirations (.39), ability (.24), academic self-concept (.18), coursework (.13) and GPA (.13). Only the direct effects of ability, GPA and educational aspirations, however, are substantial (beta > .1).

The largest direct effects on occupational aspirations at T3 are occupational aspirations at T2 (.23) and T1 (.13), college attendance (.12), and sex (.11, favoring girls). SES has the largest total effect (.26) on T3 occupational aspirations, but most of these effects are mediated through T1 and T2 occupational aspirations.

Educational aspirations two years after the normal graduation from high school (T3), not surprisingly, are largely determined by college attendance

during those two years. Consistent with this observation the effects of preceding variables on T3 educational aspirations are mostly mediated by college attendance. It is interesting to note, however, that T2 educational aspirations have a substantial effect on T3 educational aspirations (.28) beyond what can be explained by actual college attendance. Apparently, many respondents had unfulfilled aspirations that they still intend to fulfill.

Summary and Implications

The focus of the present investigation is on the effects of attending higher-ability or lower-ability high schools. Equally able students attending higher-ability high schools were likely to select less demanding coursework and to have lower academic self-concepts, lower GPAs, lower educational aspirations, and lower occupational aspirations in both their sophomore and senior years of high school. The negative effects of attending higher-ability schools were also shown for scores on T2 ability tests and college attendance, though these effects were smaller. For many T2 and T3 outcomes, there were statistically significant negative effects of school-average ability beyond those that could be explained in terms of T1 outcomes. This implies that there are new, additional negative effects of school-average ability during the last two years of high school beyond the already substantial negative effects found in the sophomore year. Whereas the sizes of some of these negative effects were small, it is important to reiterate that the effect of attending a higher-ability high school was not positive for any of the T1, T2 or T3 outcomes considered here. These findings are consistent with previous research but the size and representativeness of the sample, the diversity of the outcomes, and the strength of the longitudinal analyses make the present findings more compelling than those in previous research.

As the present analyses indicate, it is important to evaluate the effect of school-average ability in the context of a model that controls for individual levels of SES and particularly academic ability. The uncorrected correlations between school-average ability and the subsequent variables tend to be positive, indicating that the average of academic ability and of other academic outcomes tend to be higher in higher-ability schools than in lower-ability schools. However, all of this advantage in the uncorrected outcome measures -- and more -- can be explained by the individual characteristics (i.e., ability and SES) of the students who attend these schools. Whereas a disproportionate number of high-achieving students come from higher-ability schools, it is also apparent that an even larger

proportion of students attending such schools are not achieving academic outcomes commensurate with their academic ability. Using an input-output analogy, the value added by higher-ability schools is negative compared to that of the lower-ability schools. In conclusion, the academic outcomes produced by higher-ability schools are not as good overall as would be expected on the basis of the quality of students who attend these schools.

The focus of this study was on the negative effects of school-average ability, but it is also interesting to note that there were positive effects of school-average SES. Whereas the positive effects of school-average SES were smaller and less consistent than the negative effects of school-average ability, the total effects of school-average SES were never significantly negative for any of the outcomes considered here. This pattern is like that previously reported by Alwin and Otto (1977) in the review of school context effects. As described earlier, school contexts may have negative effects due to social comparison processes or positive effects due to group identification or reflected glory processes. The findings here suggest that students may identify with values related to the school-average SES context, but use school-average ability as a basis of social comparison.

Studies of school effectiveness have traditionally been unable to show large effects due to any school characteristics. In relation to the effect sizes typically found in school effectiveness research, the negative effects of school-average ability are quite large for at least some of the outcomes. A devil's advocate may still argue that in absolute terms the effect sizes are not large, particularly for some outcomes. Even this devil's advocate must admit, however, that there is no support whatsoever for any positive benefits associated with attending higher-ability schools. Because this finding conflicts so strongly with conventional wisdom, it may be the most important practical implication of this research.

In evaluating the implications of these findings, several characteristics of the present investigation are important. First, because of the size and representativeness of the HSB data the results have very strong generality. Second, because of the consistency of the results for outcomes measured in the sophomore and senior years, the findings generalize across high school years. Third, the total effects of school-average ability do not depend on the particular causal ordering of the T1, T2, and T3 outcomes posited here. Fourth, because similar results were found for the Youth in Transition Data (Marsh, 1987) that were collected 15 years earlier, the results apparently generalize across disparate age cohorts. However, it

is also important to emphasize that the sizes of these negative effects of school-average ability are typically small and represent an average across 1000 high schools and many thousands of students. Hence there will be some higher-ability schools that produce academic outcomes commensurate with the quality of their higher-ability students and some students who will be advantaged by attending such higher-ability schools. It is also important to emphasize that the focus of the present investigation was almost exclusively -- except for general self-concept and, perhaps, occupational aspirations -- on academic constructs. Hence, there may be important nonacademic advantages produced by attending higher-ability schools that were not considered here.

The school ability context for purposes of this study was represented by the mean ability level of students in the HSB study who attended the school. Whereas this measure is defensible, it is admittedly crude. It does not take into account the range or variability of ability levels in the school, though this has been shown to be important in forming psychological impressions (c.f., Marsh, 1974). It does not take into account the differentiable school contexts that may exist for specific academic contents (e.g., English and mathematics). It does not take into account that students may attend some classes in which students are selected according to ability. Felson and Reed (1986), for example, suggest that the frame-of-reference is better inferred from the average ability level of other students in the same track and same school than just those in the same school. Finally, there is an implicit assumption that students passively integrate information in forming a frame of reference, but recent research (e.g., Folger, 1987; Levine & Moreland, 1987; Ruble & Frey, 1987) suggests that this is an active, complicated process with considerable scope for individual differences. Refinements such as these are unlikely to undermine the general conclusions of this research, but they will add to the understanding of the social comparison process.

Marsh (1987; Marsh & Parker, 1984) emphasized that the frame-of-reference effects produced by school-average ability have important practical considerations for parents who consider the possibility of placing their children in higher-ability schools. This earlier research emphasized academic self-concept rather than the broad array of academic constructs considered here. Marsh, warned that at least for some children the early formation of a self-image of themselves as a poor student may be more detrimental than the possible benefits of attending a higher-ability school. Similarly, based on his study of college males, Davis warned that

"Counselors and parents might well consider the drawbacks as well as the advantages of sending their boy to a 'fine' college, if, when doing so, it is fairly certain that he will end up in the bottom ranks of his graduating class" (1966, p. 31). The results of the present investigation support these earlier cautions, but also call into question the supposed advantages of attending higher-ability schools. Even though the disadvantages of attending higher-ability schools may not generalize to all higher-ability schools and to all individual students, the results of these studies demonstrate that it is unjustified to assume that attending higher-ability schools will necessarily result in any academic advantages. On the basis of this study and previous research it appears that academically selective schools do not provide academic benefits beyond those provided by less selective schools and apparently disadvantage many students attending these schools.

Unlike previous research in this area, the present investigation provides possible guidance about how the negative effects of school-average ability may be counteracted. Most of the these negative effects were shown to be mediated by academic self-concepts and educational aspirations. According to the theoretical model in Figure 1 school-average ability negatively affects academic self-concept by affecting the frame of reference that students use in evaluating their own accomplishments. Whereas it may be difficult to counteract the tendency for students to compare their accomplishments with those of their class-mates in higher-ability schools, a variety of options exist: (a) more effort could be made to create a cooperative learning environment instead of competitive environment that reinforces the social comparison process (see Johnson & Johnson, 1985); (b) more emphasis could be placed on criterion-referenced assessment instead of norm-referenced assessment, thereby reducing the emphasis on social comparisons; (c) the use of externally normed tests would demonstrate to students how they compare with a broader normative population instead of just other students in their own school; (d) internal assessments could be externally moderated so that feedback to students was in terms of a broader normative population; and (e) students in academically selective schools need to be constantly reminded that collectively they are an academically gifted group of students thereby emphasizing the normative role of group identification instead of social comparisons. Because school-average ability negatively affects T2 academic self-concepts beyond its already substantial negative effects at T1, it is important to maintain these -- and any other strategies -- that are successfully able to counteract the negative effects

of school-average ability on academic self-concept.

The second variable shown to be important in mediating the negative effects of school-average ability was educational aspirations. Educational aspirations are substantially influenced by many other variables, and so it is possible to affect educational aspirations through these variables. Because educational aspirations are substantially influenced by academic self-concept, improving academic self-concept is likely to indirectly increase educational aspirations. Next to academic self-concept, the T1 outcome having the largest effect on educational aspirations was coursework selection. Equally able students are less likely to select advanced courses and to be in the academic track when they attend higher-ability high schools, and this affects educational aspirations. Thus, getting more students in higher-ability schools to select advanced coursework should counteract some of the negative effects of school-average ability. Similarly, the unfortunate practice of placing average-ability students into remedial-like classes just because they happen to be among the least able students in a higher-ability school may be unjustified.

Many of the negative effects of school-average ability on educational aspirations were not, however, mediated by other T1 outcomes considered here. This suggests that school administrators and classroom teachers may need to work directly on educational aspirations. This may be more difficult, however, because the process whereby school-average ability actually affects educational aspirations -- except indirectly through academic self-concept -- is apparently not so well understood as it is for academic self-concept. Nevertheless, it should not be difficult for administrators in higher-ability schools to reinforce in students the value, appropriateness, and possibility of further education.

Ultimately, it may be necessary for school administrators and for parents to re-evaluate the widely held -- but erroneous -- assumption that academically selective schools necessarily produce any academic benefits. On average, students are apparently disadvantaged by attending academically selective schools and so it is only a minority who are likely to be advantaged by this experience. An important role for further research is to identify the school characteristics, individual characteristics, and their interaction that allow some students to benefit from higher-ability schools.

Footnotes

[1] Academic ability measures, as described in Appendix 1, are composite measures defined by standardized tests in vocabulary, reading comprehension, essay writing, mathematics and science. In keeping with previous research of the BFLPE and school contexts, these composites are labelled as ability measures for present purposes. Others might argue that they should be called achievement measures. Measurement experts (e.g., Anatasi, 1980; Cronbach, 1970; Ebel, 1980), however, suggests that distinction between ability and achievement is probably not a valid one. Furthermore, the remarkable stability of these tests scores and the inability of HSB studies to find variables posited to affect achievement that are related to changes in these scores during the last two years of high school suggests that they at least act the way ability measures are supposed to act. For these reasons I chose to use the term ability instead of achievement, though the substantive and theoretical interpretations in no way depend on this verbal distinction.

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Table 1

Effects (standardized beta weights) of School-average SES (MEANSES) and School-average Ability (MEANABIL) on Subsequent Outcomes, Followed By Estimates of These Effects After Controlling For Selected Outcomes

			Outcome Variables Being Controlled											
			Matching T1 Outcome		ACDSC1		EDASP1		ACDSC1 & EDASP1		All Time 1 Outcomes		ACDSC1, EDASP1 & ACDSC2	
	MEAN-SES	MEAN-ABIL	MEAN-SES	MEAN-ABIL	MEAN-SES	MEAN-ABIL	MEAN-SES	MEAN-ABIL	MEAN-SES	MEAN-ABIL	MEAN-SES	MEAN-ABIL	MEAN-SES	MEAN-ABIL
Time 1 Outcomes														
6) GENSC1	02	-08##	---	---	00	-02	---	---	---	---	---	---	---	---
7) ACDSC1	07##	-21##	---	---	---	---	---	---	---	---	---	---	---	---
8) CRSWRK1	06#	-15##	---	---	05#	-12##	---	---	---	---	---	---	---	---
9) EFFORT1	-01	01	---	---	-03	07##	---	---	---	---	---	---	---	---
10) GPA1	-02	-16##	---	---	-05#	-08##	---	---	---	---	---	---	---	---
11) EDASP1	16##	-23##	---	---	14##	-15##	---	---	---	---	---	---	---	---
12) OCCASP1	08##	-12##	---	---	07##	-09##	---	---	---	---	---	---	---	---
Time 2 Outcomes														
13) ABIL2	05##	-03#	05##	-03#	05##	-02	04##	-02	04##	-01	04##	-01	04##	-01
14) GENSC2	04	-13##	03	-09##	03	-08##	02	-10##	02	-08##	02	-07#	03	-05
15) ACDSC2	03	-22##	00	-14##	00	-14##	-02	-15##	-02	-11##	-01	-10##	---	---
16) CRSWRK2	09##	-18##	07##	-11##	08##	-14##	04	-11##	04#	-10##	04#	-06##	04#	-08##
17) EFFORT2	02	-04	02	-04	00	02	01	01	-01	03	01	01	-01	07##
18) GPA2	-03	-12##	-02	-04#	-04##	-08##	-05#	-10##	-05#	-07##	-01	-04#	-04	-05
19) EDASP2	15##	-20##	06##	-08##	13##	-14##	06##	-08##	06##	-07##	06##	-06##	07##	-04
20) OCCASP2	11##	-11##	09##	-08##	10##	-08##	08##	-06##	08##	-05#	07##	-05#	08##	-04
Time 3 Outcomes														
21) COLLEGE	06##	-09##	---	---	05#	-05#	01	-01	01	00	01	00	01	01
22) EDASP3	17##	-20##	10##	-11##	15##	-16##	10##	-11##	10##	-10##	11##	-10##	11##	-08##
23) OCCASP3	11##	-09##	09##	-06##	10##	-06##	07##	-04#	07#	-03	07##	-03	08##	-02

Note. See Appendix 1 for a description of the variables. All coefficients, standardized beta weights presented without decimal points, come from one of seven sets of multiple regressions. In the first set, each T1, T2, and T3 outcome was predicted by the set of 5 independent variables (SEI, SES, ABIL1, MEANSES, MEANABIL). In the subsequent sets of multiple regressions, additional outcomes -- or sets of outcomes -- were added to the 5 independent variables. To the extent that the effects of the school-average variables are affected by the inclusion of additional outcomes, these outcomes are inferred to be mediating the effects of the school-average variables.

# $p < .05$; ## $p < .01$.

Table 2

Results for Path Model in Figure 2. Direct Effects (DE), Total Effects (TE), and Correlations (r) Relating Each Column Variable to Each Row Variable.

Variables		1	2	3	4	5	6	7	8	9	10	11	12
Independent Variables													
1) SEX	DE	---											
	TE	---											
	r	---											
2) SES	DE	(-06)	---										
	TE	---	---										
	r	-06**	---										
3) ABIL1	DE	-02	44**	---									
	TE	-02	44**	---									
	r	-02	44**	---									
4) MEANSES	DE	00	44**	14**	--								
	TE	00	55**	14**	---								
	r	-03	55**	35**	---								
5) MEANABIL	DE	-01	28**	36**	(72)	---							
	TE	00	43**	36**	---	---							
	r	-03	43	48	78	---							
Time 1 Outcomes													
6) GENSC1	DE	-08**	10**	10**	02	-08**	---						
	TE	-08**	12**	07**	02	-08**	---						
	r	-09**	12**	11**	05**	03	---						
7) ACDSC1	DE	08**	07**	44**	07**	-21**	(28)	---					
	TE	09**	21**	37**	07**	-21**	---	---					
	r	08**	21**	39**	10**	08**	32**	---					
8) CRSWRK1	DE	04*	11**	40**	04	-11**	02	15**	---				
	TE	06**	30**	42**	06*	-15**	02	15**	---				
	r	04**	30**	47**	17**	17**	12**	33**	---				
9) EFFORT1	DE	19**	04*	06**	-03	09**	04**	28**	12**	---			
	TE	21**	19**	24**	-01	00	05**	30**	12**	---			
	r	20**	18**	27**	12	15**	14**	38**	27**	---			
10) GPA1	DE	09**	04*	40**	-05*	-08**	-01	31**	09**	11**	---		
	TE	15**	27**	54**	-02	-16**	00	36**	10**	11**	---		
	r	14**	26**	55**	11**	15**	14**	54**	40**	37**	---		
11) EDASP1	DE	01	21**	08**	14**	-13**	01	26**	17**	09**	09**	---	
	TE	08**	41**	30**	16**	-23**	02	35**	20**	10**	09**	---	
	r	06**	41**	42**	26**	19**	18**	49**	43**	34**	43**	---	
12) OCCASP1	DE	25**	13**	06**	07**	-07**	00	09**	11**	05**	06**	(26)	---
	TE	28**	24**	17**	08**	-12**	01	14**	12**	05**	06**	---)	---
	r	27**	22**	24**	14**	11**	06**	25**	25**	22**	27**	41**	---

(Table 2 Continued on next page)

Table 2 (continued)

Variables		1	2	3	4	5	6	7	8	9	10	11	12
Time 2 Outcomes													
13) ABIL2	DE	-03##	03##	77##	04##	-01	00	-01	04##	03##	07##	04##	01
	TE	00	44##	84##	05##	-03#	00	05##	06##	04##	07##	04##	01
	r	-02	44##	87##	35##	44##	12##	38##	47##	29##	54##	44##	25##
14) GENSC2	DE	-03	01	04	02	-07##	36##	06##	04#	01	02	03	00
	TE	-04#	10##	90##	04	-13##	36##	08##	05##	01	02	03	01
	r	-05##	10##	12##	03	00	40#	22##	13##	11##	14##	16##	07
15) ACDSC2	DE	05##	01	02	-01	-10##	06##	24##	06##	09##	19##	13##	03#
	TE	14##	20##	33##	03	-22##	07##	39##	12##	13##	21##	13##	03#
	r	13##	19##	36##	05##	04#	20##	51##	34##	35##	49##	43##	26##
16) CRSWRK2	DE	-02	02	09##	04	-06##	01	00	34##	02#	08##	15##	01
	TE	04##	33##	46##	09##	-18##	03	18##	40##	06##	12##	16##	01
	r	02	33##	51##	20##	20##	14##	37##	58##	28##	46##	48##	26##
17) EFFORT2	DE	15##	-01	-14##	01	03	-01	-01	-01	37##	02	01	-03#
	TE	26##	14##	17##	02	-04	04#	23	11	42##	09##	-02	06##
	r	25##	12##	19##	08##	09##	10##	30##	22##	51##	31##	27##	18##
18) GPA2	DE	08##	02	14##	-02[a]	-02	-02	-02	00	02	51##	06##	-02
	TE	18##	26##	56##	-03	-12##	-01	22##	08##	11##	55##	-03	-01
	r	16##	25##	57##	12##	17##	10##	43##	37##	34##	72##	35##	23##
19) EDASP2	DE	-01	10	01	06##	-03	01	-01	-01	-01	-03	41##	04##
	TE	08##	42##	33##	15##	-20##	02	25##	17##	10##	09##	47##	04##
	r	06##	42##	45##	27##	21##	16##	42##	41##	32##	42##	67##	34##
20) OCCASP2	DE	11##	05##	03	07##	-04	00	02	-01	-01	-01	09##	22##
	TE	20##	24##	20##	11##	-11##	00	12##	07##	05##	04##	11##	23##
	r	19##	23##	26##	17##	13##	06##	23##	22##	20##	24##	32##	37##
Time 3 Outcomes													
21) COLLEGE	DE	03#	10##	-03	-02	04	00	-04	00	03#	00	06##	-01
	TE	10##	42##	36##	06##	-09##	01	15##	14##	10##	13##	27##	01
	r	07	41	47	26	25	12	34	38	30	42	51	27
22) EDASP3	DE	-06##	06##	05#	08##	-07##	01	02	00	-01	08##	05##	05##
	TE	04#	45##	41##	17##	-20##	02	20##	14##	08##	08##	33##	07##
	r	01	44##	48##	30##	24##	15##	39##	39##	29##	40##	58##	33##
23) OCCASP3	DE	11##	04#	-04	04#	-01	00	02	-01	00	-02	02##	13##
	TE	22##	26##	17##	11##	-09##	06	12##	07##	05##	04##	12##	19##
	r	21##	24##	24##	18##	14##	06##	23##	21##	20##	24##	32##	34##
Multiple R^2		---	---	---	319	295	029	182	262	216	470	404	190

(Table 2 Continued on next page)

Table 2 (continued)

Variables		13	14	15	16	17	18	19	20	21	22	23
Time 2 Outcomes												
13) ABIL2	DE	---										
	TE	---										
	r	---										
14) GENSC2	DE	-01	---									
	TE	-01	---									
	r	12##	---									
15) ACDSC2	DE	08##	01	---								
	TE	08##	20##	---								
	r	37##	19##	---								
16) CRSWRK2	DE	13##	15##	09##	---							
	TE	14##	01	09##	---							
	r	52##	01	40##	---							
17) EFFORT2	DE	09##	03	25##	08##	---						
	TE	12##	03	26##	08##	---						
	r	23##	13##	42##	27##	---						
18) GPA2	DE	56##	00	14##	03#	03#	---					
	TE	16##	00	15##	03	03#	---					
	r	14##	13##	49##	43##	32##	---					
19) EDASP2	DE	09##	-03#	22##	14##	07##	00	---				
	TE	14##	-02	25##	15##	07##	01	---				
	r	48##	15##	52##	52##	33##	39##	---				
20) OCCAPS2	DE	08##	-01	05##	05##	05##	-01	(173)	---			
	TE	09##	-01	07##	06##	06##	-01	----	---			
	r	28##	07##	25##	26##	20##	23##	39##	---			
Time 3 Outcomes												
21) COLLEGE	DE	15##	-01	05##	07##	00	13##	39##	04	---		
	TE	24##	-02	18##	13##	03#	13##	39##	02	---		
	r	51##	11##	42##	47##	28##	45##	64##	31##	---		
22) EDASP3	DE	05##	-01	05##	02	02	-01	28##	04##	36##	---	
	TE	19##	-02	19##	11##	05##	04#	42##	05##	36##	---	
	r	51##	14##	45##	48##	28##	40##	70##	35##	70##	---	
23) OCCASP3	DE	05#	01	02	-00	00	03	08##	23##	12##	(17)	---
	TE	12##	00	08##	04#	02	05	13##	23##	12##	---	---
	r	27##	07##	25##	25##	19##	25##	37##	40##	35##	42##	---
Multiple R^2		779	175	378	473	355	600	566	215	498	634	268

Note. All coefficients (presented without decimal points) are presented in standardized form. See Appendix 1 for a definition of the variables and Figure 2 for the path model used as the basis of this analysis. Coefficients in parentheses are correlated residuals between pairs of variables in which no ordering was posited (e.g., academic and general self concepts). Direct and total effects represent the effects of column variables on row variables (not the effects of row variables on column variables).

# $p < .01$; ## $p < .001$.

Appendix 1

Description of the 23 Constructs and the Variables From the High School and Beyond Data File Used To Define Them (in brackets).

Independent Variables

---

1) Sex (SEX). [SEX] (1=male, 2= female)

2) Socioeconomic status (SES). The mean of the nonmissing T1 [BYSES] and T2 [FUSES] composite variables provided by NCES as part of the data file. Each SES composite was based on five components: (a) father's occupation, (b) father's education, (c) mother's education, (d) family income, and (e) material possessions in the home.

3) Academic Ability (ABIL1). A composite variable based on scores on six standardized tests [YBMTH1FS, YBMTH2FS, YBSCINFS, YBWRITFS, BBVOCBFS, BBREADFS] testing mathematics, science, writing, vocabulary and reading (see Heyns & Hilton, 1982, for a review of these tests).

4) School-average ability (MEANABIL). A composite variable based on the school average of the T1 academic ability scores for all students in the same school. For purposes of just the two school-average variables, data were based on responses from all 29,737 students who comprised the initial sample for the sophomore cohort rather than the random sample of these students selected for the second follow-up.

5) School-average SES (MEANSES). A composite variable based on the school average of the SES variable for all students in the same school (also see MEANABIL).

(Appendix 1 continued on next page)

Appendix 1 (continued)

Time 1 (Sophomore Year) Outcome Variables

6) General Self Concept (GENSC1). A composite variable [BBCONCPT] constructed by NCES from responses to 4 items like those on the Rosenberg (1965) self-esteem scale (e.g., I'm a person of worth).

(Appendix 1 continued on next page)

7) Academic Self-concept (ACDSC1). A composite variable constructed from responses to one cluster of 8 dichotomous items that refer to attitudes towards English [YB035A, YB035B, YB035C, YB035D] and mathematics [YB035E, YB035F, YB035G, YB035H] and three individual items asking if subjects are interested in school [BB059C], are seen by others as a good student [YB053D], and feel they have the ability to complete college [BB069]. The mean of the nonmissing responses to the first 8 items was obtained first, then this mean and responses to the other three items were standardized, and finally the mean of the nonmissing responses to these four standardized scores was used to infer academic self-concept.

8) Coursework (CRSWRK1). A composite variable representing the standardized mean of nonmissing responses to two dichotomous items asking students if they have taken advanced level coursework in English [BB011C] or mathematics [BB011D] and the standardized response to an item asking students for their academic program [BB002] that was recoded so that 2=academic track and 1= other.

9) Effort (EFFORT1). A composite variable representing the standardized mean of three items asking students how frequently they came to class without paper or pencil (YB016A), without their books [YB016B], or with incomplete homework [YB016C] and the standardized response to a single item [BB015] asking students the amount of time they spent on homework.

10) Grade Point Average (GPA1). A single-item variable [BB007] asking subjects to report their grades so far in high school (8 = mostly As, 7= About half As and half Bs, ..., 1=Mostly below Ds).

11) Educational Aspirations (EDASP1). A composite of variable representing the mean z-score of three variables [BB061G, BB065, BB067] asking aspirations if disappointed if do not graduate from college, expected level of schooling, and lowest level of school satisfied with (higher scores reflect higher educational aspirations).

12) Occupational Aspirations (OCCASP1). Occupational aspirations at age 30 [BB062] (scored the same way as parent's occupational status).

(Appendix 1 continued on next page)

Appendix 1 (continued)

Time 2 (Senior Year) Outcome Variables

13) Ability (ABIL2). See ABIL1.

14) General Self Concept (GENSC2). See GENSC1.

15) Academic Self Concept (ACDSC2). A composite variable constructed from the individual items used to define ACDSC1 (the cluster of 8 attitudes towards English and mathematics were not included in the T2 survey).

16) Coursework (CRSWRK2). See CRSWRK1.

17) Effort (EFFORT2). See EFFORT1.

18) Grade Point Average (GPA2). A composite variable [HSGRADES] provided by NCES that was based on data from student transcripts.

19) Educational Aspirations (EDASP2). See EDASP1.

20) Occupational Aspirations (OCCASP2). See OCCASP1.

Time 3 (Post-secondary) Outcome Variables

21) College Attendance (Coll). As part of the second follow-up survey respondents were asked if they were full-time students, part-time students, or non-students (coded 2, 1 and 0 respectively for present purposes) at each of four time points between 1982 and 1984 [PSESOC82, PSESFE83, PSESOC83, PSESFE84]. The mean of the nonmissing values for these 4 variables was used to define the college attendance construct.

22) Educational Aspirations (EDASP3). A single item [SY13] asking for eventual educational aspirations used as part of EDASP1 and EDASP2..

23) Occupational Aspirations (OCCASP3). See OCCASP1.

Note. The abbreviations for each variable presented in parentheses are used in the Tables and Figures to refer to the variables. The variables in brackets are the variable names used on the HSB data file. Outcome measures used at T2 and T3 are based on the same items as those used at T1 unless otherwise noted. All composite measures were defined as the mean of non-missing values so that the variable was missing only if all the components were missing.

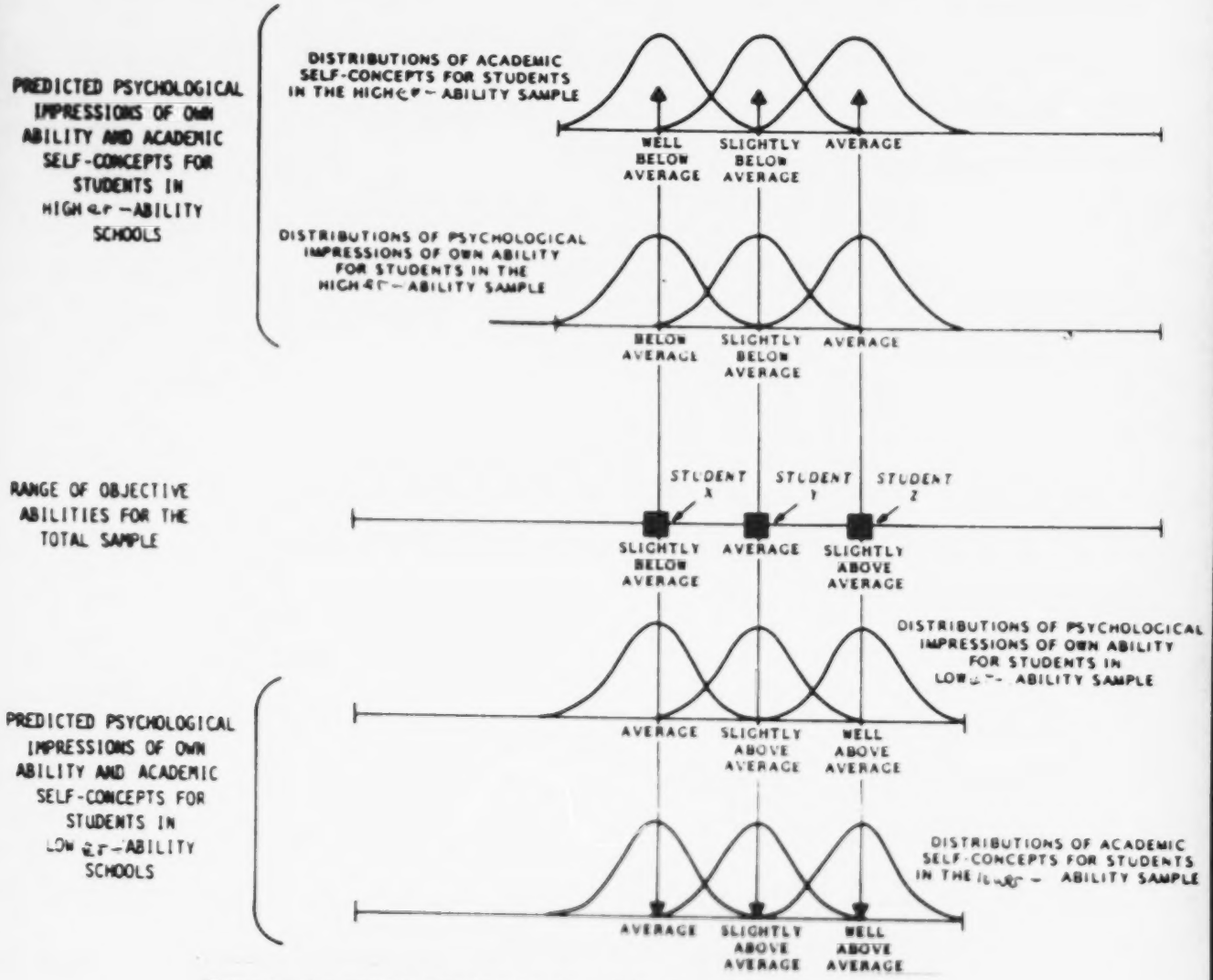
PREDICTED PSYCHOLOGICAL IMPRESSIONS OF OWN ABILITY AND ACADEMIC SELF-CONCEPTS FOR STUDENTS IN HIGH ABILITY SCHOOLS
DISTRIBUTIONS OF ACADEMIC SELF-CONCEPTS FOR STUDENTS IN THE HIGH ABILITY SAMPLE
WELL BELOW AVERAGE
SLIGHTLY BELOW AVERAGE
AVERAGE
DISTRIBUTIONS OF PSYCHOLOGICAL IMPRESSIONS OF OWN ABILITY FOR STUDENTS IN THE HIGH ABILITY SAMPLE
BELOW AVERAGE
SLIGHTLY BELOW AVERAGE
AVERAGE
RANGE OF OBJECTIVE ABILITIES FOR THE TOTAL SAMPLE
STUDENT X
STUDENT Y
STUDENT Z
SLIGHTLY BELOW AVERAGE
AVERAGE
SLIGHTLY ABOVE AVERAGE
DISTRIBUTIONS OF PSYCHOLOGICAL IMPRESSIONS OF OWN ABILITY FOR STUDENTS IN LOW ABILITY SAMPLE
AVERAGE
SLIGHTLY ABOVE AVERAGE
WELL ABOVE AVERAGE
PREDICTED PSYCHOLOGICAL IMPRESSIONS OF OWN ABILITY AND ACADEMIC SELF-CONCEPTS FOR STUDENTS IN LOW ABILITY SCHOOLS
DISTRIBUTIONS OF ACADEMIC SELF-CONCEPTS FOR STUDENTS IN THE LOW ABILITY SAMPLE
AVERAGE
SLIGHTLY ABOVE AVERAGE
WELL ABOVE AVERAGE

Figure 1. One possible operationalization of the frame of reference effect used to explain the Big Fish Little Pond Effect. The academic self-concepts of the students X, Y and Z depends not only on their actual academic abilities, but also the range of abilities in the schools that they attend.

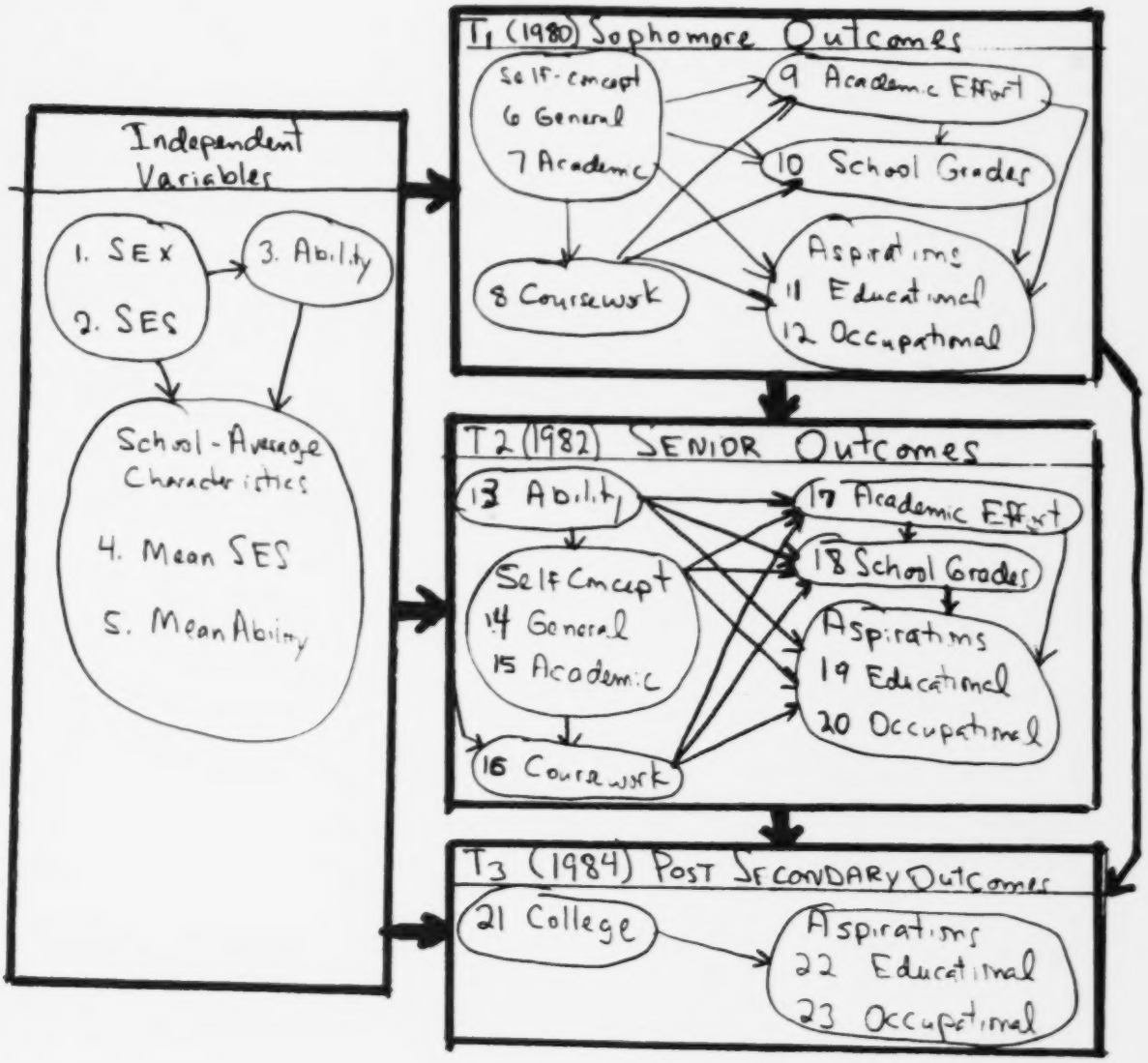

Figure 2. A path model positing a specific ordering of 23 variables based on their temporal ordering and previous theoretical research. The four blocks represent the independent variables and outcomes measured at T1, T2, and T3 respectively. Every variable with each block is posited to effect every variable in all subsequent blocks. Within each block are ovals containing one or more variables and their ordering is reflected by the single-headed arrows. No ordering of variables within the oval is posited, thoughh these variables are assumed to be correlated. The 23 variables are described in more detail in Appendix 1.